

REMARKS/ARGUMENTS

Claims 1, 6 and 8 have been amended, claims 5 and 9 have been canceled, and claims 10-14 have been added.

Support for a feature that an uppermost portion (upper surface) of a plating (5) is located at a position higher than a surface of a protection film (4) can be found at page 9, lines 22-24 of the specification. Support for new claims 10 and 13 can be found at page 9, lines 11-12. The term “engaging grooves” recited in new claims 11 and 14 is shown in Figs. 1-4 as V-shaped grooves defined by the conductor pattern 3 and the solder resist (protection film) 4. As shown in Fig. 2(E), engaging portions (63) of a solder ball (6) are received by and engaged with the engaging grooves.

Claims 1, 2, 4, 7 and 8 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Tsuji in view of Beaman. Claims 5, 6 and 9 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Tsuji and Beaman in view of Lee.

Independent claims 1 and 8 have been amended and now require a plating covering a top surface and an upper portion of a conductor pattern and having an uppermost portion located at a position higher than a surface of the protection film. However, none of the cited references teach or suggest the above-referenced required claim limitation.

The claimed invention can achieve the following advantages: (1) The conductor pattern has a top surface, a bottom surface, and a pair of flat side surfaces. Each of the side surfaces having a lower portion covered by the protection film and an upper portion exposed from the

protection film. The width of the bottom surface is greater than that of the top surface. This improves the connection strength of the conductor pattern to a substrate and prevents separation of the conductor pattern from the substrate. (2) The top surface and the upper portion of the conductor pattern are covered by a plating. The plating has an uppermost portion located at a position higher than a surface of the protection film. This enables the joining of, for example, a solder ball or a solder paste to be performed more easily. In addition, when electrically testing a printed circuit board, a probe used during the testing can be electrically contacted with the conductor pattern easily. Even if a lateral force is applied to a solder ball attached on the plating, the lateral force acts on the conductor pattern and not the substrate. This prevents damage of the substrate. Further, the plating improves the connection strength of a solder ball to the conductor pattern. The plating prevents corrosion of the conductor pattern. Therefore, the present invention can improve reliability of a printed circuit board.

None of the cited references teach or suggest the required claim limitations of claims 1 and 8. In addition, a combination of the cited references can not achieve the above advantages and claims 1 and 8 are not obvious over the cited references. Applicant believes that amended independent claims 1 and 8 contain patentable subject matter and are now in condition for allowance. Claims 2, 4, 6 and 7 are dependent claims that dependent upon independent claim 1, and thus should be allowable for the above reasons as well as for the additional elements they contain. Accordingly, Applicant respectfully requests that the rejection of claims 1, 2, 4, 6, 7 and 8 under 35 U.S.C. § 103(a) be withdrawn in light of the above amendments and remarks.

New claims 10-14 are added to further define the invention and recite elements not in the original set of claims. Applicant believes that new claims 10-14 contain patentable subject matter and are in condition for allowance.

In view of the amendments and remarks presented above, the Applicant believes that the application is now in condition for allowance, and respectfully requests reconsideration of the application, withdrawal of the rejections and allowance of the claims. No new matter has been added to the application. The Applicant respectfully requests that the Examiner telephone the undersigned in the event a telephone conference would be helpful in advancing the application towards allowance.

Respectfully submitted,

GODFREY & KAHN, S.C.

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By: William K. Baxter
William K. Baxter
Reg. No. 41,606

Attorneys of Record for the Applicant
GODFREY & KAHN, S.C.
780 North Water Street
Milwaukee, WI 53202-3590
Telephone: 414-273-3500
Facsimile: 414-273-5198
Email: wbaxter@gklaw.com

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